



AN AYURVEDIC VIEW OF MUSCULOSKELETAL SYSTEM

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ABSTRACT

The human body is a complex organism, the gross mechanical properties of which are enabled by an interconnected musculoskeletal network controlled by the nervous system. The nature of musculoskeletal interconnection facilitates stability, voluntary movements, and robustness to injury⁵⁰. It is also known as the loco motor system, and previously known as the activity system⁵¹. The skeleton is the structure that gives us our shape and provides protection for our internal organs. It offers a supportive framework for the attachment of muscles there for facilitating movement. Our bones also act as a site for the production of blood cells and a store of minerals, particularly calcium. The skeleton has five main functions: Support, Protection, Movement, Blood cell production and mineral store⁵⁴. Despite being an ancient science *Ayurveda* gives detailed description about human Anatomy and Musculoskeletal system. In *Ayurveda*, *Peshi*, *Asthi*, *Sandhi*, *Snayu*, *Kandara* along with *Jaala*, *Kurcha*, *Mamsarajju*, *Seevani*, *Sangatha*, and *Simantha* are described as the part of Musculoskeletal system. Diseases related to musculoskeletal system are increasing day by day. Proper knowledge about this system will help to understand the diseases better and proper and effective management.

KEYWORDS: Musculoskeletal System, *Ayurveda*, *Asthi*, *Sandhi*, Osteology, *Asthi Sareera*

INTRODUCTION

According to *Ayurveda* health is *dhatu sathmya*. That is a balanced condition of body elements which results in *sukha* and *prasannathmata* (i.e. ease and sense of wellbeing). On the other hand disease is the state of *dhatu vaishmya* which leads to *dukha* and *aprasannata*, which is exactly opposite to health¹.

The definition of health proposed by Acharyas centuries ago hold well against the present day definitions. According to them a healthy person is one who has balanced state of *dosa*, *agni*, *dhatu*, proper functioning of *mala*, *prasanna athma indriya* and *mana*². This definition comprises all the perspectives of health, positive health and QOL as recommended by WHO.

Another explanation of health according to *Ayurveda* is "*Rogasthu dosha vaishmyam, dosa sathmyam arogatha*." Which means the state of disease is that in which there is imbalance if *doshas* and the balanced state of *dosha* is health³.

As per *Acharya Kashyapa*, "a person should have eagerness for food as well as he should have the capacity to digest the ingested food, the proper excretion of metabolic wastes, well satisfied sense organ with sound sleep to acquire the strength and longevity of life. The state or status, which leads to acquiring the strength and longevity, is defined as Health⁴.

DISCUSSION

Musculoskeletal disorders and Ayurveda

According to *Ayurveda* Musculoskeletal disorders can be compared with the diseases affecting *Peshi*, *Asthisandhis* and the associated structures such as *mamsa*, *sira*, *snayu kandara* etc. These structures constitute *Madhyama rogamarga*.

Rogamarga

Rogamarga is a unique concept in *Ayurveda*. *Trayorogamarga* is explained by *Acharya Charaka*⁵. The meaning of *roga* is one which causes pain. *Marga* means pathway. So *rogamarga* is considered as pathway of diseases. *Rogamarga* is three in number, they are

1. *Bahya*
2. *Madhyama*
3. *Abhyanthara*

Importance of Rogamarga

According to *Acharya Madhava* the knowledge of *dosa* movement is important in the formulation of treatment protocols⁶. *Acharya Chakrapani* says that it is helpful in predicting *Sadhyaasadhya*. Disease caused by single *dosha* afflicting one *rogamarga* with *catuspada* is a sign of good prognosis (*sukhasadhya*)⁷.

Disease occurring in two *rogamarga* is *krichsadhya* even though it is new (*nava*). Diseases seated in the deeper *dhatu*s like *meda*, *asthi* are paliable (*yaapya*). A disease involving three *rogamarga* is incurable (*prathyakheya*). The knowledge of *rogamarga* helps to identify the *doshagathi*. By this we can understand the disease process and its treatment procedure.

The concept of *rogamarga* is explained in the *Brihatthrayees* except *Susrutha samhita*.

Madhyama Rogamarga

The *Madhyama Rogaarga* or second pathway includes the diseases that affecting the structures

- The *marmas*

- The *sandhis*
- The *asthis*
- The *snayus*, *siras*, and *kandaras* that holds the *asthisandhis*.

Structures	<i>Astanga Sangraha</i> ⁸	<i>Astanga Hrdaya</i> ⁹	<i>Charaka Samhita</i> ¹⁰
• <i>Moordha</i>	+	+	+
• <i>Hrdaya</i>	+	+	+
• <i>Vasthi</i>	+	+	+
• <i>Asthi sandhi</i>	+	+	+
• <i>Snayu</i>	+	+	+
• <i>Sira</i>	+	+	-
• <i>Kandara</i>	+	+	+
• <i>Asthi samyoga</i>	-	-	+

Table No.1: The structures coming under *madhyama rogamarga* according to different *Acharyas*.

The structures of *madhyama rogamarga* are not closely connected anatomically with each other.

Marmas are the vital points where prana is situated. These are the points where *mamsa*, *sira*, *snayu sandhi* and *asthi* conjoint. Damage to these *marma* can lead to a variety of consequences from pain to death¹¹.

Acharya Arunadatta in his commentary on *Astanga hrdaya* confirms that the term *sandhi* in the context of *madhyama rogammarga* only refers *asthisandhis* (bony joints). He says that the other *sandhis* of the body should not be included here. *Arunadatta* also clarifies the associated structures as *sira*, *snayu*, *kandara*, *dhamani*, and *koorcha*¹².

Parts	Charaka	<i>Astanga hrdaya</i> ¹³	<i>Susrutha</i>
<i>Mamsa/peshi</i>	400	500(male) 520(female)	500(male)
<i>Asthi</i>	360	360	300
<i>Sandhi</i>	200	200	210
<i>Snayu</i>	900	900	900
<i>Sira</i>	700	700	700
<i>Kandara</i>		16	16

Table No. 2: Musculoskeletal parts and numbers according different *Acharyas*.

PESHI (Muscular Structures)

According to *Acharya Susrutha* the muscular structures of the body carries veins, arteries, and nerves¹⁴. There are five hundred *Peshis* in our body. In which four hundred *Peshis* are in upper and lower limb. Sixty six *Peshis* are in middle part of the body and thirty four *Peshis* are in head and neck. In females there are twenty extra *Peshis*¹⁵. Considering the *angaprathyanga niirmanam* of *Susrutha*, *pesi* is evolved from *pisita* with the influence of *vayu* and *ooshma*¹⁶. The main functions of *peshis* are, to give strength and support to body, protecting internal structures. *Acharya Bhavaprakasa* mentions that *peshis* are responsible for movement of movements.

KANDARA (Tendons)

Tendons of the body are responsible for the movements of the body like extension, contraction etc. they are sixteen in number,

out of which eight are in the extremities, four in the neck and remaining four in the back¹⁷.

SNAYU (Ligament)

Snayu connect the joints and muscles together. *Snayus* are of four types.

- *Sushia* (Porous)
- *Prthu* (Broad)
- *Prathanavati* (Stretched)
- *Vrtha* (Circular)

Prathanavathi are present in extremities and all bony joints. *Vrtha* are known as *kandara* by experts. *Sushira* are present at the end of *amasaya*(stomach), *pakvasaya*(large intestine) and *basti*(urinary bladder). *Prthu* are present in *parsva* (flanks), *urus*(chest), *prstha*(back) and *sira*(head). *Snayu* help the human body to carry weight.

Snayus are nine hundred in number; of these six hundred are in the *sakha* (extremities), two hundred and thirty in the *kostha* (trunk), and seventy in *griva* (neck) and above¹⁸.

DHAMANI (Arteries)

There are different opinion about *Siras* and *Dhamanies*. Origin of both *Siras* and *Dhamanies* are from umbilicus. There are twenty four *Dhamanies* in the body. As per *Susrutha*, *Dhamanies* are different from *Siras* by virtue of continuous pulsatory movement¹⁹. But according to *Charaka* there are two hundred *Dhamanies* in the body²⁰.

SIRA (Veins)

Siras are the vessels which take the *dosas* (impurities) along with them. There are seven hundred *Siras* in the body. *Siras* can be compared to blood vessels or lymph vessels. *Mrdupaka* of *medasneha* along with *pitha ooshma* and *vayu* are the responsible factors for the origin of *Siras*²¹.

ASTHI (Bones)

According to *Vedas* there are three hundred and sixty bones in human body. But according to *Salya tantra* there are only three hundred bones. Out of these one hundred and twenty are in the *sakha* (extremities), one hundred and seventeen in the *sroni* (pelvis), *parsva* (flanks), *prstha* (back), and *uras* (chest) together; sixty three above neck²².

Types of asthi²³

Asthis are of five types. They are

1. *Kapala* (flat bones)
2. *Rucaka*
3. *Taruna* (cartilages)
4. *Valaya* (curved or irregular bones)
5. *Nalaka* (tubular or long bones)

Kapala are present in *janu* (knee), *nitamba* (buttocks), *amsa* (shoulder), *ganda* (cheek), *talv* (palate), *sankha* (temples), and *siras* (head).

Rucaka are in the teeth.

Taruna are present in *ghrana* (nose), *karna* (ear), *griva* (neck), and *akshikosa* (orbit of the eye)

Valaya are present in *parsva* (flanks), *prstha* (back), and *uras* (chest).

The remaining are *nalaka*.

Importance *asthi*²⁴

1. Make body erect.
2. Give protection to muscles, veins and ligaments.

ASTHI SANDHI (Joints)²⁵

Sandhis are of two types.

1. *Cestavanta* (movable)
2. *Sthira* (immovable)

Cestavanta are present in *sakha* (extremities), *hanu* (lower jaw) and *kati* (waist); all the remaining joints are *sthira*.

Sandhis are two hundred and ten in total number. Out of these sixty eight are in the *sakha*, fifty nine in the *koshta* (trunk), and eighty three in the neck and above it (head).

Types of *sandhis*²⁶

Sandhis are of eight types.

1. *Kora sandhi* (hinge joint)
2. *Ulukhala sandhi* (ball and socket joint)
3. *Samudga sandhi* (symphysis joint)
4. *Pratara sandhi* (pivot joint and gliding joint)
5. (suture joint)
6. *Vayasatunda sandhi* (condyloid joint)
7. *Mandala sandhi*
8. *Sankhavarta sandhi*

Kora are found in the *angulis* (fingers), *manibandha* (wrist), *gulpha* (ankle), *janu* (knee) and *kurpara* (elbow)

Ulukhala are found in the *kaksa* (axilla), *vankasana* (groin) and *dasana* (teeth)

Samudga are found in the *amsapitha* (shoulder), *guda* (rectum/ anus) and *nitamba* (buttocks)

Pratara are found in *griva* (neck) and *prstavamsa* (vertebral column)

Tunnasevani are found in the *sirahkapala* (flat bones of the head) and *katikapala* (flat bones of the pelvis)

Vasayatunda are present at the two sides of the *hanu* (lower jaw)

Mandala in the *nadi* (tubes) of *kantha* (throat), *hrdaya* (heart), *netra* (eye) and *kloma* (trachea).

CONCLUSION

Ayurvedic view of musculoskeletal system is comprised of *Peshi*, *Asthi*, *Sandi*, *Snayu*, *Kandara*, with supporting structures

like *Dhamani* and *Sira*. Detailed descriptions regarding each structures are available in different *Ayurvedic* treatises. *Asthi dhatu* gives proper frame work to body. *Peshi*, *Kandra*, *Snayu* along with *Asthi* help the movement of the body. Associated structures like *Siras* and *Dhamani* help provide proper nourishment to these structures.

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